End-of-life programme for older care home residents: an evaluation study

ORIGINAL ARTICLE

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ABSTRACT

Background. The ‘enhance community geriatric assessment team service for end-of-life care in residential care homes’ (ECEOL) scheme has been implemented in Hong Kong West Cluster since October 2015. The aim of the present study was to examine whether advance care planning (ACP) and do-not-attempt cardiopulmonary resuscitation - non-hospitalised (DNACPR-NH) discussion is feasible among residential care home for the elderly (RCHE) residents, whether desired ACP is respected when patients admitted to hospital, and whether there are reductions in emergency attendances, hospital admissions, and health care cost.

Methods. Records of residents of the 26 RCHEs with ECEOL in Hong Kong West Cluster between 1 October 2015 and 31 December 2017 were reviewed. The primary outcome measures were the difference in the numbers of accident and emergency department (AED) attendances, acute and convalescence hospital admissions before and after 6 months of ECEOL, and the compliance with ACP and DNACPR-NH. The secondary outcome measure was reduction in healthcare cost after implementation of ECEOL.

Results. A total of 223 residents (60 men and 163 women) were analysed. Of them, 208 (93%) had DNACPR-NH established and 214 (96%) had ACP established in the RCHE (n=208) or ward (n=6). During the study period, 115 (52%) residents died. Of them, 69 (60%) died in designated geriatric convalescence wards. Of the 223 residents, the compliance of DNACPR-NH and ACP was 96% and >91.5%, respectively. Comparing 6 months before and after ECEOL, among the 223 residents, the numbers of AED attendances, acute hospital admissions, and convalescence hospital admissions significantly reduced 40%, 43%, and 24%, respectively. Comparing alive and death cases, at 6 months after ECEOL, the death cases had significantly more AED attendances, acute hospital admissions, and convalescence hospital admissions. The potential annual cost saving was HK\$6.52 million for 223 residents or HK\$29000 per resident.

Conclusion. ACP and DNACPR-NH discussion was feasible in older RCHE residents. Compliance to DNACPR-NH and ACP was good, and most residents died in geriatric convalescence wards. ECEOL reduces unnecessary hospital service utilisation and healthcare cost. Further expansion of ECEOL to all RCHEs is recommended.

Key words: Advance care planning; Health care costs; Homes for the aged; Terminal care

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BACKGROUND

End-of-life (EOL) issues are common in disease trajectory of older people who have multiple comorbidities.¹ Those with advanced dementia, organ failure, or degenerative neurological diseases can have unpleasant symptoms similar to those with cancers.²⁻⁶ Provision of EOL care for this patient group is one aspect of geriatric medicine.⁷⁻¹⁰ In Hong Kong, around 8.5% of older population are living in residential care home for the elderly (RCHE),^{11,12} and EOL care should be provided to residents with chronic illnesses.^{1,13-15} Indeed, 28.8% to 35% of older residents in Hong Kong preferred to die in their RCHEs.^{16,17}

Since October 2015, the Hospital Authority of Hong Kong has implemented a territory-wide programme called 'enhance community geriatric assessment team service for end-of-life care in residential care homes' (ECEOL).^{18,19} It aims at providing EOL care for older RCHE residents with terminal conditions. The Gold Standards Framework Prognostic Indicator Guidance²⁰ is used to identify suitable candidates based on three triggers: (1) the surprise question of "Would you be surprised if this patient were to die in the next 6 months?", (2) general indicators of decline and deterioration, with increasing need or choice for no further active care, and (3) specific clinical indicators related to certain conditions. Link-nurses act as case managers for targeted RCHE residents.

Among 69 RCHEs in the Hong Kong West Cluster, 26 have joined the ECEOL. The Community Geriatric Assessment Team (CGAT) collaborates with the palliative medical unit of the Grantham Hospital, which provides training to RCHE and CGAT staff, holds regular case conferences with the CGAT, and assists in complex case management. To avoid duplication of service provision, RCHE residents who have been seen by the palliative care team are not recruited into the ECEOL.

In the ECEOL, advance care planning (ACP) is deliberated, and preference of using nasogastric tube feeding, intravenous or subcutaneous hydration, intravenous antibiotics, and non-invasive positive pressure ventilation (NIPPV) at the last stage of life are discussed. The desired ACP choices are recorded in the ACP form, and do-not-attempt cardiopulmonary

resuscitation - non-hospitalised (DNACPR-NH) orders are made. Advance directive (AD) is signed if the resident is mentally sound and desires to do so. The RCHE staff bring the ACP, DNACPR-NH records and AD (if available) whenever the residents attend an accident and emergency department (AED) or are admitted to hospital. The healthcare team acts according to the ACP if possible and makes treatment decisions. RCHE residents are regularly visited by link-nurses, and ad hoc problems are managed by link-nurses and geriatricians. If hospital admission is required, designated geriatric convalescence wards with EOL programmes (medical and geriatric wards in Fung Yiu King Hospital or geriatric medical unit in Grantham Hospital) are arranged.^{10,21,22} Residents admitted through AED to acute medical wards in Queen Mary Hospital are taken over by the geriatric team, and step-down care in designated geriatric convalescence wards are arranged.

ACP remains a new concept in Hong Kong. The aim of the present study was to examine whether ACP and DNACPR-NH discussion is feasible among RCHE residents, whether desired ACP is respected when patients admitted to hospital, and whether there are reductions in emergency attendances, hospital admissions, and health care cost.

METHODS

This retrospective study was approved by the Institutional Review Board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster (UW 18-224).

Records of residents of the 26 RCHEs with ECEOL in Hong Kong West Cluster between 1 October 2015 and 31 December 2017 were reviewed. Data collected were demographics, religion, source of financial support, functional and mobility status, principal diagnosis, number of other diagnoses, use of enteral feeding, numbers of AED attendance and acute hospital and convalescence hospital admissions 6 months before and after ECEOL, and Abbreviated Mental Test (AMT) score and Barthel Index (20).^{23,24} We also recorded whether residents had established ACP, DNACPR-NH, and/or AD, the place where ACP discussion took place, the surrogate responsible for ACP discussion,^{18,25} and the content and preferences of the ACP. We also recorded the place and main cause of death for those who died,

whether residents were cared in the designated geriatric convalescence wards, the length of hospital stay, and compliance with DNACPR-NH, ACP, and AD.

The primary outcome measures were the difference in the numbers of AED attendances, acute and convalescence hospital admissions before and after 6 months of ECEOL, and the compliance with ACP and DNACPR-NH. The secondary outcome

measure was reduction in healthcare cost after implementation of ECEOL.

Statistical analyses were performed using SPSS (Windows version 25; IBM Corp, Armonk [NY], USA). Paired *t*-test and independent *t*-test were used for within-group comparison, and independent *t*-test was used for between-group comparison. All tests were two-tailed, and a *p* value of <0.05 was considered statistically significant.

TABLE 1
Clinical characteristics of residential care home for the elderly (RCHE)
residents (n=223)

Characteristics	Value*
Types of RCHEs	
Care and attention homes or nursing homes	144 (64.6)
Private RCHEs	82 (27.8)
Self-finance homes	17 (7.6)
Age, y	90.1±7.6
No. of men:women	60:163
Marital status	
Widowed	154 (69.1)
Married	47 (21.1)
Single	17 (7.6)
Divorced	5 (2.2)
Religion	
Christian	23 (10.3)
Buddha	20 (9)
Catholics	16 (7.2)
Traditional Chinese worships	15 (6.7)
Others	4 (1.8)
Nil	145 (65)
On Comprehensive Social Security Assistance	117 (52.5)
Bedbound or chairbound	211 (94.6)
Activity of daily living dependent	201 (94.2)
Barthel Index (20)	1.7±2.5
Abbreviated Mental Test	1.2±2.3
Enteral feeding	83 (37)
Principal diagnosis	
Advance dementia	153 (68.6)
Stroke	30 (13.4)
Organ failure	26 (11.7)
Neurodegenerative disease other than dementia	8 (3.5)
Active cancer	5 (2.2)
No. of other diagnosis	6.1±2.2

* Data are presented as mean ± standard deviation or No. (%) of residents

RESULTS

A total of 229 RCHE residents recruited into ECEOL during the study period were identified. Six of them were excluded, as they had moved to RCHes without ECEOL or to RCHes in other clusters. The remaining 223 residents (60 men and 163 women) were analysed (**TABLE 1**). Of them, 208 (93%) had DNACPR-NH established and 214 (96%) had ACP established in the RCHE (n=208) or ward (n=6) [**TABLE 2**]. The most common surrogate responsible for ACP discussion was daughters (46%), followed by sons (36%), spouses (6%), and adopted children (2%). Only eight (3.5%) residents had AD established.

During the study period, 115 (52%) residents died. The mean duration from recruitment to death was 8.5 ± 7.4 months. Of them, 69 (60%) died in designated geriatric convalescence wards, 24 (20.8%) in acute medical wards, 11 (9.6%) in AED, 6 (5.2%) in non-medical wards, and 5 (4.3%) in non-designated convalescence wards. The length of hospital stay of the index admission was 3.6 ± 3.3 (range, 1-22) days in acute hospitals and 10.7 ± 15 (range, 1-75) days in convalescence hospitals. The most common cause of

death was chest infection (n=70, 60.8%), followed by sepsis other than chest infection (n=14, 12.2%), heart attack (n=7, 6%), poor feeding (n=7, 6%), and cancer (n=5, 4.3%). Of the 115 residents who died, 107 (93%) had DNACPR-NH and 106 (92%) had ACP established. Of the 223 residents, the compliance of DNACPR-NH and ACP was 96% and >91.5%, respectively (**TABLE 3**).

Comparing 6 months before and after ECEOL, among the 223 residents, the numbers of AED attendances, acute hospital admissions, and convalescence hospital admissions significantly reduced 40%, 43%, and 24%, respectively (**TABLE 4**). The reduction in these numbers was also significant in both alive and death cases separately, except for the number of convalescence hospital admissions in death cases. Comparing alive and death cases, at 6 months after ECEOL, the death cases had significantly more AED attendances, acute hospital admissions, and convalescence hospital admissions.

The cost per resident day for medical specialty was HK\$3842 in acute hospital and HK\$2503 in convalescence hospital. Each AED attendance

TABLE 2
Preferences of those with advance care planning

Advance care planning	No (%) of residents (n=214)
Nasogastric tube	
Accept	24 (11.2)
Prefer not	78 (36.4)
Already on	80 (37.4)
Cannot decide at the moment	32 (15)
Parenteral hydration	
Agree for intravenous or subcutaneous drip	148 (69.1)
Prefer subcutaneous over intravenous	11 (5.1)
Prefer not intravenous or subcutaneous	21 (9.8)
Cannot decide at the moment	34 (16)
Intravenous antibiotics	
Accept	152 (71)
Prefer not	28 (13)
Cannot decide at the moment	34 (15.9)
Non-invasive positive pressure ventilation	
Accept	65 (30.4)
Do not accept	114 (53.3)
Cannot decide at the moment	35 (16.3)

TABLE 3
Compliance with do-not-attempt cardiopulmonary resuscitation (non-hospitalised) and advance care planning in death cases

	Compliance
Do-not-attempt cardiopulmonary resuscitation (non-hospitalised) [n=107]	96%
Advance care planning (n=106)	
Nasogastric tube	95%
Intravenous/subcutaneous drip	91.5%
Intravenous antibiotics	95.2%
Non-invasive positive pressure ventilation	99%

TABLE 4
Numbers of acute and emergency department (AED) attendances, acute hospital admissions, and convalescence hospital admissions in all, alive and death cases 6 months before and after joining the programme

Parameter	6 months before programme*	6 months after programme*	Reduction	p Value
All cases (n=223)				
No. of AED attendance	2.5±2.3	1.5±1.6	40%	<0.001
No. of acute hospital admission	2.4±2.3	1.37±1.4	43%	<0.001
No. of convalescence hospital admission	0.94±1.2	0.71±1.06	24%	0.022
Alive cases (n=108)				
No. of AED attendance	2.56±2.3	1.13±1.28	56%	<0.001
No. of acute hospital admission	2.2±2.3	1.05±1.14	52%	<0.001
No. of convalescence hospital admission	0.86±1.2	0.42±0.71	51%	<0.001
Death cases (n=115)				
No. of AED attendance	2.67±2.3	1.85±1.8 [†]	31%	<0.001
No. of acute hospital admission	2.56±2.25	1.7±1.8 [‡]	33%	<0.001
No. of convalescence hospital admission	1.0±1.21	1.0±1.26 [§]	0%	0.95

* Data are presented as mean ± standard deviation

[†] p=0.001 compared with alive cases

[‡] p=0.003 compared with alive cases

[§] p<0.001 compared with alive cases

incurred a cost of HK\$1272. In Hong Kong West Cluster, the mean length of hospital stay in acute medical hospital and convalescence hospitals was 2.47 and 11 days, respectively. Comparing 6 months before and after ECEOL, the total cost saving was HK\$2.18 million [(2.4 - 1.37) × 223 residents × 2.47 days × HK\$3842] for acute hospital admission, HK\$1.4 million [(0.94 - 0.71) × 223 residents × 11 days × HK\$2503] for convalescence hospital admission, and HK\$0.28 million [(2.5-1.5) × 223 residents × HK\$1272] for AED attendance. The annual expenditure for ECEOL was HK\$1.19 million. The net cost saving in 6 months for 223 residents was HK\$3.26 million [(HK\$2.18 million + HK\$1.4 million + HK\$0.28 million) – HK\$1.19 million / 2].

The potential annual cost saving was HK\$6.52 million (HK\$3.26 million × 2) for 223 residents or HK\$29 000 per resident.

DISCUSSION

ACP is an integral part of EOL care as it allows patients to decide their future care preferences. ACP covers the patient's state of health and anticipated progression, values and beliefs, treatment expectations and goals, support and nursing care preferences, preferences for life-sustaining treatments, and DNACPR-NH orders. The ACP process involves communications between patients, family members, and healthcare providers. In mentally incapacitated patients, ACP is discussed

based on the family's knowledge of the patients' values and preferences. A local focus group study elucidated different barriers and facilitators in ACP discussion.²⁶ A recent study reported that an ACP programme involving residents, family, and different groups of people working in the nursing home was feasible and acceptable by nursing home staff and management.²⁷ The present study demonstrated that ACP discussion was feasible in older RCHE residents, with 93% of them established DNACPR-NH and 96% established ACP. Nonetheless, some residents or relatives needed more time to consider and discuss among family members and did not establish the ACP and DNACPR-NH at the first geriatrician consultation in EOL clinic. A small number of residents had not established ACP and DNACPR-NH before they died. Discussion of ACP was more suitable in RCHEs where the residents, family members, and RCHE staff were all present to discuss ACP in privacy, with 97% of ACPs made in RCHEs. 69.1% of residents/family members preferred the use of intravenous or subcutaneous hydration during the EOL stage; 71% agreed to use intravenous antibiotics if needed; and 30.4% accepted NIPPV. When residents were admitted to hospitals, the clinical team would discuss with patients and family members for the risk and benefits of NIPPV. NIPPV could be offered in both acute and convalescence wards if they considered NIPPV as a therapeutic trial.

Compliance with ACP and DNACPR-NH respects the wishes of patients and enhances comfort care. ACP can reduce anxiety, depression, and post-traumatic stress among family members. Two RCHE residents received cardiopulmonary resuscitation despite DNACPR-NH: one died in AED with the RCHE staff having forgot to bring the DNACPR-NH record; the other died in a non-medical ward despite the presence of DNACPR-NH.

At 6 months after ECEOL, AED and hospital service utilisation reduced significantly, particularly acute medical admission, in all, alive, and death cases. As the mean duration from recruitment to death was 8.5 ± 7.4 months, the reduction in health service utilisation at 6 months was unlikely to be due to the death of residents within this period. Several factors led to marked reduction in AED attendance and hospitalisation. Ad hoc problems of the residents were managed by link-nurses and

geriatricians promptly. This reduces the need of AED attendance and hospital admission and increases residents' confidence to stay in the RCHEs instead of AED. EOL care training was provided to all RCHE staff. This equips the RCHE staff the necessary knowledge and skill to take care of residents with EOL symptoms. During the ACP and DNACPR discussion process, CGAT nurses and geriatricians explained to the residents and their family members the diagnosis, prognosis, and what to expect in future. This increases residents' confidence to manage their EOL symptoms in RCHEs instead of AED. The ECEOL is cost-effective. At 6 months after ECEOL, AED attendances, acute and convalescence hospital admissions were higher in death cases than alive cases. Death cases tended to use more AED and hospital services. Most death cases died in convalescence hospitals, and thus convalescence hospital admission did not reduce significantly. A recent study reported that integration of an ACP model in home healthcare reduced the 60-day hospital readmission rate.²⁸

We believe that ECEOL improves the quality of dying by allowing expression of patients wish through ACP and DNACPR-NH. Good compliance with ACP and DNACPR-NH, as well as admission to designated geriatric wards ensure comfort care at the final stage of life. EOL symptoms of residents can be managed in RCHE instead of AED. Successful EOL programme in RCHE requires good medical-social collaboration, adequate staff training and confidence in EOL care, and collaboration with AED and acute and convalescence medical wards.

There were limitations to the present study. In this retrospective study, data accuracy is reliant on the quality of documentation in case notes. Only 6 months of statistics after ECEOL on AED attendances and hospital admissions were analysed; a longer period of analysis is needed to accurately evaluate the AED and hospital service utilisation. The potential cost saving was just a crude calculation, and saving as a result of bed days and AED attendance reduction was only a nominal saving. There was no actual reduction of staff and other expenses as a result of reduced admission. The reasons for non-adherence to ACP were not explored. ACP aims to increase understanding of the patient and guide the healthcare team in providing care and treatment. ACP is not a legal document and decisions on

medical treatment are based on the best interests of the patient with reference to ACP. Further research is warranted to understand the reasons for non-adherence and to improve the compliance with ACP.

CONCLUSION

ACP and DNACPR-NH discussion was feasible in older RCHE residents. Compliance to DNACPR-NH and ACP was good, and most residents died in geriatric convalescence wards. ECEOL reduces unnecessary hospital service utilisation and healthcare cost. Further expansion of ECEOL to all RCHEs is recommended.

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DECLARATION

The authors have no conflicts of interest to disclose.

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